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6052 534.014.2 : 531.394

Kaliski S. Dynamic Non-Steady Axially Symmetric Problem of a Cylinder. 2

1. M+C (+D)

„Dynamiczny nieustalony kołowo-symetryczny problem walca". Archiwum Mechaniki Stosowanej (PAN), No. 6, Warszawa, 1958, pp. 793—809, 2 figs.

A discussion of the problem of unfixed constrained vibrations of a cylinder fixed or free on walls, assuming circular symmetry. A different approach to solution of the general (spatial) problem of the cylinder is to be presented in the separate paper. In view of the similar manner of solution the author discusses in detail the first edge problem of the cylinder, that is for completely fixed walls, assuming a voluminous field of forcing forces. In the second edge problem, surface forces may also be treated as voluminous forces distributed on the boundary layer. The problem has been solved in the following way. By introducing the dynamical resetting functions, the problem was reduced to solution of two independent bi-wave functions within the cylindrical coordinates. The equation was subjected to the Laplace transformation. Then a basic system was assumed with edge conditions so selected that solution might be presented by means of adequately simple systems of complete functions. By introducing additional functions of reaction on the walls of the roller, the required edge conditions of the starting problem are obtained. For determining the reaction of the walls of the roller, we obtain the system of three integral equations additionally dependent on

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Kaliski S. Dynamic Non-Steady Axially Symmetric Problem of...

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1
1

the parameter of integral transformation p. The system of three integral equations, upon breaking-up the field of forcing forces into symmetrical and anti-symmetrical forces with respect to central surface of the roller, perpendicular to the axis, has been reduced to two systems, each, with two integral equations. In wiew of the identical manner of solving these systems, one of them only was taken into consideration. Assuming proper solutions for reaction of the walls of the roller, the system of integral equations was reduced to an infinite system of algebraic equations dependent on the transformation parameter p. The complete regularity of the above infinite system of equations is proved, and consequently the existence and uniformity of solutions, as well as the congruity of the method of successive approximations with the given estimates of the solutions. Finally, the problem of inverted transformation of solutions is discussed in an analogous way.

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6056

Kaliski S., Kurlandzki J. The Cauchy's Problem for a Transversally Isotropic Elastic Body.

Problem Cauchy'ego dla ciała sprężystego o izotropii poprzecznej". Archiwum Mechaniki Stosowanej (PAN), No. 6, Warszawa, 1958, pp. 825—838.

A consideration of the Cauchy problem concerning the body with lateral anisotropy with participation of mass forces. The problem is solved by introducing twice the resolting function which reduces the initial system of equations to a quadratic equation and two uncoupled equations of fourth degree of identical form. The quadratic equation is a generalized wave-equation with constant factors. It is solved by the Kirchoff method. For solving the equation of the fourth degree, the Fourrier method is applied with the solving nucleus. The solving nuclei are expressed by a surface integral extended over part of the normal surfaces. The solutions obtained are in the form of formulae expressed by means of definite integrals.

3
1. M+C (+D)
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539.12 : 539.389.3

✓6057

Kaliski S. Some Idea of Constructing Basic Solutions for Elastic and Non-Elastic Orthotropic Bodies.

„O pewnej idei budowania rozwiązań podstawowych dla sprężystych i niesprężystych ciał ortotropowych". Archiwum Mechaniki Stosowanej (PAN), No. 1, Warszawa, 1959, pp. 43—60, 2 figs.

The author presents an idea of constructing basic solutions and solving the Cauchy problem for anisotropic bodies, particularly elastic and non-elastic orthotropic ones. For non-elastic bodies the rheologic model of Boltzmann-Maxwell solid body is adopted. Since no strict basic solution has so far been obtained for an anisotropic non-elastic body with quantity of elastic constants greater than that for lateral isotropy, it is proposed to omit these difficulties by solving a certain edge problem permitting, with the aid of a complete system of eigenfunctions, strict determination of the solution in the form of series in relation to eigenfunctions. The author assumes that the initial system of equations is hyperbolic and that the initial assumptions are distributed on unicompact limited area. We seek the solution for $t < C$, where C is constant, and discard the asymptotic solution with $t \to \infty$. To solve the problem, we imagine unlimited space a solid of finite dimensions, containing a point of application of an impulse and a region of initial disturbances. We assume dimensions of the solid such that for $t < C$ the deformation waves, dispersing from the point of

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Kaliski S. Some Idea of Constructing Basic Solutions for....

disturbation, may not reach the surface of the solid and there may be no reflection. Then the solution of the edge problem will not depend on dimensions of the solid, and the accepted edge conditions which influence only the choice of a complete system of functions are used for solving the problem. Assuming adequately simple shape and edge conditions in the solid, the basic solution can be determined, the Cauchy problem solved, and conformity obtained with the solution for unlimited space for $t < C$. The author has definitely solved the case of an orthotropic elastic and non-elastic body with twelve relaxation functions.

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3

KALISKI, S.; PETYKIEWICZ, J.

Dynamic equations of motion and solving functions for elastic and inelastic anisotropic bodies in the magnetic field. Proceed vibr probl no.2:17-35 '59.

1. Department of Vibrations, Institute of Basic Technical Problems, Polish Academy of Sciences, Warsaw.

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3

KALISKI, Sylwester

On a certain conception of dynamic nonsteady solution for an orthotropic elastic and inelastic semispace. Proceed vibr probl no.2:43-58 '59.

1. Department of Vibrations, Institute of Basic Technical Problems, Polish Academy of Sciences, Warsaw.

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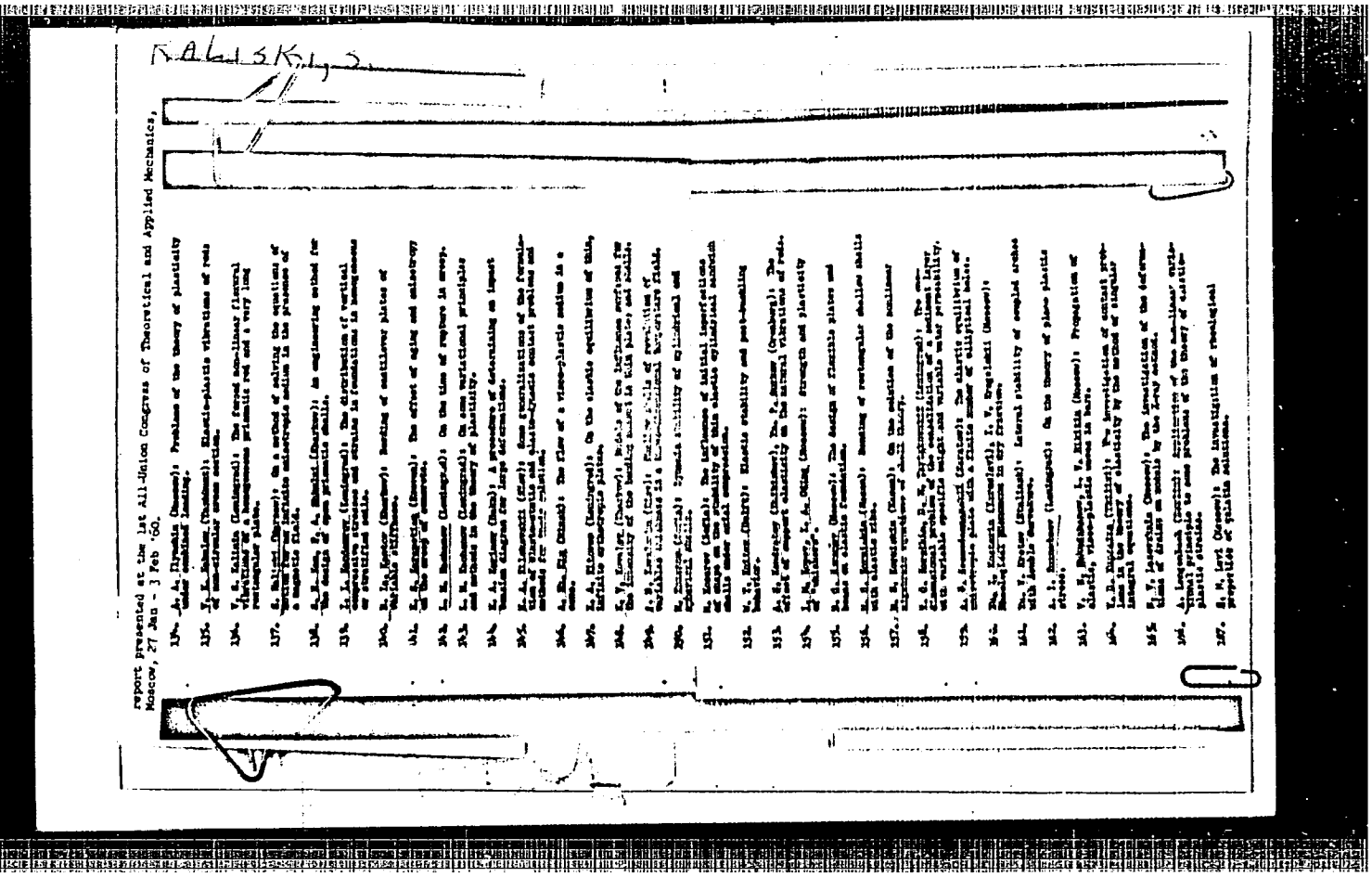

report presented at the 1st All-Union Congress of Theoretical and Applied Mechanics, Moscow, 27 Jan - 3 Feb '60.

134. A. A. Ilyushin (Moscow): Problems of the theory of plasticity under combined loading.

135. V. K. Kabulov (Tashkent): Elastic-plastic vibrations of rods of non-circular cross section.

136. V. S. Kalinin (Leningrad): The forced non-linear flexural vibrations of a homogeneous prismatic rod and a very long rectangular plate.

137. S. Kaliski (Warsaw): On a method of solving the equations of motion for an infinite anisotropic medium in the presence of a magnetic field.

138. S. N. Kan, F. A. Shkulai (Kharkov): An engineering method for the design of open prismatic shells.

139. I. I. Kandamrov (Leningrad): The distribution of vertical compressive stresses and strains in foundations in homogeneous or stratified soils.

140. B. Ia. Kantor (Kharkov): Bending of cantilever plates of variable stiffness.

141. K. S. Karapetian (Erevan): The effect of aging and anisotropy on the creep of concrete.

142. L. M. Kachanov (Leningrad): On the time of rupture in creep.

143. L. M. Kachanov (Leningrad): On some variational principles and methods in the theory of plasticity.

144. K. A. Karimov (Baku): A procedure of determining an impact tension diagram for large deformations.

145. N. A. Kilchevskii (Kiev): Some generalizations of the formulation of elasto-static and elasto-dynamic contact problems and methods for their solution.

146. A. Kh. Kin (Minsk): The flow of a visco-plastic medium in a cone.

147. I. A. Kitovov (Leningrad): On the elastic equilibrium of thin, infinite orthotropic plates.

148. K. V. Kovalev (Kharkov): Models of the influence surfaces for the intensity of the bending moment in thin plates and shells.

149. A. D. Kovalenko (Kiev): Shallow shells of revolution of variable thickness in a three-dimensional temperature field.

150. M. Kozarov (Sofia): Dynamic stability of cylindrical and spherical shells.

151. M. Kozarov (Sofia): The influence of initial imperfections of shape on the stability of thin elastic cylindrical sandwich shells under axial compression.

152. W. T. Koiter (Delft): Elastic stability and post-buckling behavior.

153. A. S. Kondratov (Khibinkov), Yu. P. Surkov (Orenburg): The effect of support elasticity on the natural vibrations of rods.

154. I. M. Kopov, I. A. Oding (Moscow): Strength and plasticity of "whiskers".

155. D. G. Korsakov (Moscow): The design of flexible plates and beams on elastic foundation.

156. M. S. Korniakin (Kazan): Bending of rectangular shallow shells with elastic ribs.

157. M. S. Korniakin (Kazan): On the solution of the nonlinear algebraic equations of shell theory.

158. V. G. Korzhin, D. M. Tartakovskii (Leningrad): The one-dimensional problem of the consolidation of a sediment layer with variable specific weight and variable water permeability.

159. A. S. Kosmodamanskii (Saratov): The elastic equilibrium of anisotropic plate with a finite number of elliptical holes.

160. Yu. I. Kostarin (Izraelevi), I. V. Kregelskii (Moscow): Rheological phenomena in dry fraction.

161. Yu. V. Kretov (Staliazk): Lateral stability of coupled arches with double curvature.

162. A. I. Kuznetsov (Leningrad): On the theory of plane plastic stress.

163. V. N. Kukudzhanov, L. V. Nikitin (Moscow): Propagation of elastic, visco-plastic waves in bars.

164. V. D. Kupradze (Tbilisi): The investigation of contact problems in the theory of elasticity by the method of singular integral equations.

165. N. V. Lazovskaia (Moscow): The investigation of the deformations of drains on models by the X-ray method.

166. A. Langenbach (Berlin): Application of the non-linear variational principle to some problems of the theory of elastic-plastic strains.

167. S. M. Levi (Moscow): The investigation of rheological properties of gelatin solutions.

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3

KALISKI, Sylwester, (Warsaw)

Dynamic non-steady state problem of the anelastic rectangular parallelepiped. Archiw mech 12 no.5/6:801-809 '60.

1. Department of Vibrations, Institute of Basic Technical Problems, Polish Academy of Sciences, Warsaw.

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23901
P/033/60/012/002/006/008
D214/D301

84.2300 (1068,1147,1144)

AUTHOR: Kaliski, Sylwester, (Warsaw)

TITLE: Solution of the equations of motion of an isotropic conductor in a magnetic field

PERIODICAL: Archiwum mechaniki stosowanej, v. 12, no. 2, 1960, 229 - 239

TEXT: This work gives a solution of the equations of motion for an isotropic body in an infinite space and steady magnetic field, assuming finite electric conductivity and is a generalization of the author's earlier work (Ref. 5: Solution of Equations of Motion in a Magnetic Field for an Isotropic Body in an Infinite Space Assuming Perfect Electric Conductivity, Proc. Vibr. Probl., no. 3, Warsaw 1960). The method based on the above mentioned work consists of reducing the problem to a substitute boundary one. While for a perfect conductor the problem reduces to the solution of three ordinary 2nd order differential equations, for a finite

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Solution of the equations of ...

conductivity, a system of six 1st order and three 2nd order equations is obtained, i.e. characteristic equations of the 12th order. The solution for an infinite space is constructed in finite regions of propagation of the elastic and electromagnetic waves, assuming finite region of initial disturbances or excitation field. The linearized equations of notion of an isotropic inelastic body in a steady magnetic field are

$$\begin{cases} \operatorname{rot} h = \dfrac{4\pi}{c} j + \dfrac{e}{c}\dfrac{\partial E}{\partial t}, \\ \operatorname{rot} E = -\dfrac{\mu}{c}\dfrac{\partial h}{\partial t}, \quad \operatorname{div} h = 0; \ \operatorname{div} E = 0, \\ j = \lambda_1\left[E + \dfrac{\mu}{c}\left(\dfrac{\partial u}{\partial t}\times H\right)\right], \\ \varrho\dfrac{\partial^2 u}{\partial t^2} = \dfrac{\mu}{c}[j\times H] + P + G\nabla^2 u + (\lambda + G)\operatorname{grad}\operatorname{div} u - \\ \quad -\int_0^t \{Q(t-\tau)\nabla^2 u(\tau) + [R(t-\tau)+Q(t-\tau)]\operatorname{grad}\operatorname{div} u(\tau)\}\,d\tau, \end{cases} \tag{2.1}$$

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Solution of the equations of ...

which in operational form becomes

$$\sum_{k=1}^{12} K_{ik} a_k = R_i \qquad (i = 1, 2, \ldots, 12) \tag{2.2}$$

where

$$\left\{\begin{array}{l} a_1,\ a_2,\ a_3 = h_1,\ h_2,\ h_3; \\ a_4,\ a_5,\ a_6 = E_1,\ E_2,\ E_3, \\ a_7,\ a_8,\ a_9 = j_1,\ j_2,\ j_3, \\ a_{10}, a_{11}, a_{12} = u_1,\ u_2,\ u_3, \\ R_1,\ \ldots,\ R_9 = 0, \\ R_{10}, R_{11}, R_{12} = P_1,\ P_2,\ P_3. \end{array}\right. \tag{2.3}$$

The Laplace transformation of Eq. (2.2) gives

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Solution of the equations of ...

$$\sum_{k=1}^{12} \bar{K}_{ik} \bar{a}_k = \bar{R}_i \qquad (i = 1, 2, \ldots, 12), \tag{2.6}$$

where the operators $\bar{K}_{ik}$ are obtained from K_{ik} by replacing the operation $\partial/\partial t$ by the transformation parameter p, and assuming $\bar{L}_{ik}$ in the form

$$\begin{cases} \bar{L}^0_{11} = (\bar{\lambda} + \bar{G}) \dfrac{\partial^2}{\partial x^2} + \bar{G} \nabla^2, \quad \bar{L}^0_{22} = (\bar{\lambda} + \bar{G}) \dfrac{\partial^2}{\partial y^2} + \bar{G} \nabla^2, \\ \bar{L}^0_{33} = (\bar{\lambda} + \bar{G}) \dfrac{\partial^2}{\partial z^2} + \bar{G} \nabla^2, \\ \bar{L}_{12} = (\bar{\lambda} + \bar{G}) \dfrac{\partial^2}{\partial x \partial y}, \quad \bar{L}_{13} = (\bar{\lambda} + \bar{G}) \dfrac{\partial^2}{\partial x \partial z}, \quad \bar{L}_{23} = (\bar{\lambda} + \bar{G}) \dfrac{\partial^2}{\partial y \partial z}, \end{cases} \tag{2.7}$$

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Solution of the equations of ...

where

$$\bar{\lambda} = \lambda - R(p), \quad \bar{G} = G - Q(p).$$

Using the method proposed by the author (Ref. 3: On a Conception of Basic Solutions for Orthotropic Elastic and Anelastic Bodies, Arch. Mech. Stos., 6, 11, 1959, 45 - 60) and assuming that the functions P_i are distributed over a finite region, the solution for the finite region is valid until the electromagnetic of mechanical wave reaches a point of the bounding surface that is for $t < C$, where C will be found using analogous criteria (Ref. 3: Op. cit.). The form of the bounding surface is assumed to be that of a rectangular parallelepiped in the central part of which is located an exciting field. The author obtains the system of nine equations with nine unknowns. Inverse transformation by the residue method requires determination of zeros of a 12th order polynomial for various m, n, k, which has to be done by numerical approximation. The perturbation method can also be applied, but in this case

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Solution of the equations of ...

appraisal of the error becomes difficult. There are 6 references: 5 Soviet-bloc and 1 non-Soviet-bloc. The reference to the English-language publication reads as follows: P. Chadwick, Elastic Waves Propagation in Magnetic Field, Congrés Intern. de Mécanique Apll., 1956, VII, Bruxelles 1957.

ASSOCIATION: Department of Vibrations, IBTP Polish Academy of Sciences

SUBMITTED: November 15, 1959

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28124

P/033/60/012/003/004/007
D242/D302

24.2300 (1068,1482,1538)
3.2300

AUTHOR: Kaliski, S. (Warsaw)

TITLE: Solving the equations of motion of an anisotropic body in a magnetic field assuming finite electric conductivity

PERIODICAL: Archiwum mechaniki stosowanej, v. 12, no. 3, 1960, 333 - 355

TEXT: In the present paper, the author intends to give a solution for anisotropic elastic and inelastic bodies in a magnetic field assuming finite electric conductivity. The idea of the solution which consists in reducing to a suitable, substitute boundary value problem, was previously given by the author (Ref. 3: Arch. Mech. stos., 1, 11, 1959, 45-60) for the case of orthotropic bodies with no action of magnetic fields. The conception of the solution in the case of anisotropic bodies, consisting in representing the solution in a finite region in terms of several complete systems of functions, and the conditions of convergence of the solu-

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Solving the equations of motion ...

tion were given previously by the author (Ref. 4: Arch. Mech. Stos. 6, 11, 1959) for anisotropic bodies assuming no action of the magnetic field. For discussion of the present problem, the author uses the same assumption and principle of solution stated in his previous articles. Also, the proofs of convergence are similar to the former case and are omitted in the present paper. The equations are given in a linearized form. The author states that in the present paper the coefficients E_{ikmn} and the relaxation functions R_{ikmn} will be expressed by means of two label quantities A_{ik} and R_{ik} which have no tensor features. He first gives the solution for elastic bodies. For this purpose he considers a finite surface, containing in its interior the small region of the excitation field, whereby, for reasons of simplicity, he assumes homogeneous boundary conditions. He assumes this surface to be that of a rectangular parallelepiped containing the region. in which the solution is to be found for $t < C$. The region of the excitation field will be located in the center part of the rectangular parallelepiped. The

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Solving the equations of motion ...

origin of coordinates is assumed to be in the corner of the rectangular parallelepiped with the axes directed along the axes of the rectangular parallelepiped. The constant C will be fixed according to the criteria given elsewhere by the author. For $t < C$, i.e. before the disturbance wave provoked by the excitation field reaches the surface of the parallelepiped, the solution for an infinite space will coincide with that for the region of the rectangular parallelepiped. The author starts with a combination of Fourier series in terms of several complete sets of functions. By substitution and equating the coefficients of like terms he obtains, after rearrangement, a system of 48 ordinary differential equations of the first and second order with constant coefficients. He then reduces this system of 48 equations to four systems with 9 equations each (after additional elimination of three unknowns from each system), for which the characteristic equations may be reduced to equations of the 12-th order. The author points out that the integration of each of the four systems of equations, each of which is reduced practically to an ordinary differential equation of the 12-th order with constant coefficients, is difficult but, nevertheless

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Solving the equations of motion ...

it is possible to build up effectively and with any desired accuracy, a solution of the problem, which is not possible in such a simple manner by using classical methods. It should be observed that if the region under consideration and the time t tend to infinity, the Fourier series become Fourier integrals, and that the effective integration of the integrals thus obtained is very complicated. The author then discusses briefly the possibility of constructing a solution by means of the perturbation method. In order to avoid the determination of the roots of a 12-th degree equation, it is possible to make use of the fact that the electromagnetic disturbances will be very small if the motion is excited by a mass force field. Then it is possible to solve, in the first approximation, the equations of motion of an elastically anisotropic body (for H = 0) on the basis of the present method, and calculate, by means of the perturbation method and by using the solution of the simplified system of equations, the remaining characteristic quantities of the fields. This would permit one to confine oneself, in concrete calculations, to solving characteristic equations of the

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Solving the equations of motion ...

3rd degree. This case is not treated in greater detail, since the principal elements of the solutions obtained by means of the method proposed are the same, and the perturbation method does not require any generalization or special treatment. The author finally considers the case of inelastic bodies. By using the Laplace transformation and substitution, he obtains a system of algebraic equations with 48 unknowns. This system is again reduced to four independent systems with 9 unknowns each (after direct elimination of 3 unknowns from each system). By solving the four systems of algebraic equations and after substitution, one obtains the solution of the transformed problem for $t < C$. The inverse transformation equations are obtained, in general, in a numerical way. The problem is simpler for simpler models of solid. The author finally mentions that in the case of finite electric conductivity where the electromagnetic disturbances propagate with the velocity of light, the practical uses of the method of a solution for a finite region determined by the region covered by the disturbances propagating with the velocity of light, seem to be very limited (for very small t). The case

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is different for a perfect conductor and if the displacement currents are disregarded, the velocity of propagation of the disturbances being of the order of the velocity of elastic waves. However, this limitation is only apparent in a certain sense, because with the same number of terms of the series as in a small region, one obtains an identical accuracy in a large region, if dimensionless quantities are introduced and if one is not interested in the local image of the solution but in the phenomenon as a whole. There are 7 references: 5 Soviet-bloc and 2 non-Soviet-bloc. The reference to the English-language publication reads as follows: S. Kaliski On an idea of constructing basic solutions for anisotropic non-homogeneous bodies, in "Non-Homogeneity in Elasticity and Plasticity", Symposium, Warsaw, September 2-9, 1958, Pergamon Press, New York, London, 1959, 389 - 401.

ASSOCIATION: Department of Vibrations, IBTP Polish Academy of Sciences

SUBMITTED: September 15, 1959

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29286
I/033/60/012/001/005/008
D250/D302

AUTHOR: Kaliski, Sylwester (Warsaw)

TITLE: The three-dimensional dynamic problem of a cylinder of finite length

PERIODICAL: Archiwum mechaniki stosowanej, v. 1, no. 12, 1960, 72-83

TEXT: The author gives a generalization to the three-dimensional case with harmonic external forces of the axially-symmetric solution obtained previously by the author (Ref. 2: The Dynamic Non-Steady Axially Symmetric Problem of a Cylinder, Arch. Mech. stos. 6, 10 (1958), 793-810). The methods used are closely related to those used by the author in other work (Ref.: Pewne problemy brzegowe dynamicznej teorii sprężystości i ciał niesprężystych (Some Boundary Problems of the Dynamical Theory of Elastic and Inelastic Bodies) Warszawa 1957) and (Ref.3: The Dynamical Problem of the Rectangular Parallelepiped, Arch. Mech.

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The three-dimensional dynamic ...

stos. 3, 10 (1958), 329-370), and are quite conventional. The cylinder considered is bounded by r = a and z = 0, ℓ; the vector equation of motion to be solved is

$$\mu\nabla^2\mathbf{u}+(\lambda+\mu)\,\mathrm{grad\ div}\,\mathbf{u}-\varrho\frac{\partial^2\mathbf{u}}{\partial t^2}=-\mathbf{P}. \tag{2.1}$$

The components of the Green tensor for the Laplace-transformed equation are derived as

$$\left\{\tilde{u}_{\varphi r}=\sum_{lmn}\left[\frac{x_1 r_0\frac{\partial}{\partial r_0}\mathcal{J}_n(h_l^n r_0)\sin n\varphi_0\sin\alpha_m z_0}{x_0\frac{a^2\pi l}{4}h_l^{n2}\mathcal{J}_n'^2(h_l^n a)}\frac{n}{r}\mathcal{J}_n(h_l^n r)\cos\varphi\sin\alpha_m z+\right.\right.$$

$$\left.\left.+\frac{n\mathcal{J}_n(h_l^n r_0)\sin n\varphi_0\sin\alpha_m z_0}{H_0^2\frac{a^2\pi l}{4}h_l^{n2}\mathcal{J}_n'^2(h_l^n a)}\frac{\partial}{\partial r}\mathcal{J}_n(h_l^n r)\cos n\varphi\sin\alpha_m z\right]\right., \tag{3.23}$$

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$$\tilde{u}_{zr} = -\sum_{lmn} \frac{(\lambda+\mu)\alpha_m r_0 \frac{\partial}{\partial r_0} J_n(h_l^n r_0) \sin n\varphi_0 \alpha_m x_0}{\varkappa_0 \frac{a^2\pi l}{4} J_n'^2(h_l^n a)} J_n(h_l^n r) \sin n\varphi \cos \alpha_m z, \tag{3.23}$$

and

$$\tilde{u}_{r\varphi} = \sum_{lmn} \left[\frac{\varkappa_1 n J_n(h_l^n r_0) \cos n\varphi_0 \sin \alpha_m x_0}{\varkappa_0 h_l^{n^2} \frac{a^2\pi l}{4} J_n'^2(h_l^n a)} \frac{\partial}{\partial r} J_n(h_l^n r) \sin n\varphi \sin \alpha_m z + \right. \tag{3.24}$$

$$\left. + \frac{r_0 \frac{\partial}{\partial r_0} J_n(h_l^n r_0) \cos n\varphi_0 \sin \alpha_m x_0}{H_0^2 h_l^{n^2} \frac{a^2\pi l}{4} J_n'^2(h_l^n a)} \frac{n}{r} J_n(h_l^n r) \sin n\varphi \sin \alpha_m z \right],$$

$$\tilde{u}_{\varphi\varphi} = \sum_{lmn} \left[\frac{\varkappa_1 n_n J_n(h_l^n r_0) \cos n\varphi_0 \sin \alpha_m x_0}{h_l^{n^2} \frac{a^2\pi l}{4} J_n'^2(h_l^n a)} \frac{n}{r} J_n(h_l^n r) \cos n\varphi \sin \alpha_m z + \right.$$

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$$\left. + \frac{r_0 \frac{\partial}{\partial r_0} \mathcal{J}_n(h_i^n r_0) \cos n\varphi_0 \sin \varphi_m z_0}{H_0^2 h_i^{n^2} \frac{a^2 \pi l}{4} \mathcal{J}_n'^2(h_i^n a)} \frac{\partial}{\partial r} \mathcal{J}_n(h_i^n r) \cos n\varphi \sin \alpha_m z \right],$$

$$\tilde{u}_{z\varphi} = -\sum_{imn}{}' \left[\frac{(\lambda+\mu)\alpha_m n \mathcal{J}_n(h_i^n r_0) \cos n\varphi_0 \sin \alpha_m z_0}{\varkappa_0 \frac{a^2 \pi l}{4} \mathcal{J}_n'^2(h_i^n a)} \mathcal{J}_n(h_i^n r) \sin n\varphi \cos \alpha_m z \right], \qquad (3.24)$$

$$\tilde{u}_{rz} = -\sum_{imn}{}' \left[\frac{(\lambda+\mu)\alpha_m r_0 \mathcal{J}_n(h_i^n r_0) \sin n\varphi_0 \cos \alpha_m z_0}{\varkappa_0 \frac{a^2 \pi l}{4} \mathcal{J}_n'^2(h_i^n a)} \frac{\partial}{\partial r} \mathcal{J}_n(h_i^n r) \sin n\varphi \sin \alpha_m z \right],$$

$$\tilde{u}_{\varphi z} = -\sum_{imn}{}' \left[\frac{(\lambda+\mu)\alpha_m r_0 \mathcal{J}_n(h_i^n r_0) \sin n\varphi_0 \cos \alpha_m z_0}{\varkappa_0 \frac{a^2 \pi l}{4} \mathcal{J}_n'^2(h_i^n a)} \frac{n}{r} \mathcal{J}_n(h_i^n r) \cos n\varphi \sin \alpha_m z \right],$$

$$\tilde{u}_{zz} = -\sum_{imn}{}' \left[\frac{\varkappa_0 r_0 \mathcal{J}_n(h_i^n r_0) \sin n\varphi_0 \cos \alpha_m z_0}{\varkappa_0 \frac{a^2 \pi l}{4} \mathcal{J}_n'^2(h_i^n a)} \mathcal{J}_n(h_i^n r) \sin n\varphi \cos \alpha_m z \right],$$

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where r_o, ϕ_o, z_o is the point of action of a concentrated impulse, $a_m = \frac{m\pi}{\ell}$, $J_n(h^n_i a) = 0$ and

$$H_0^2 = \mu(a_m^2 + h_i^{n^2}) + \varrho p^2, \quad H_1^2 = (\lambda+2\mu)(a_m^2 + h_i^{n^2}) + \varrho p^2. \tag{3.11}$$

(p being the parameter of the transform),

$$\varkappa_0 = H^2_0 H^2_1, \qquad \varkappa_1 = \mu(h_i{}^{n^2} + a^2_m) + (\lambda+\mu)a^2_m + \varrho p^2$$

and $\varkappa_2 = (\lambda+\mu)a^2_m - H^2_1$

Considering a concentrated symmetric impulse and reactions R_1, R_2, R_3 to maintain zero displacement on the surface, a system of integral equations is obtained:

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The three-dimensional dynamic ...

$$\begin{cases} \tilde{u}_{0r}(a, \varphi, z)+\int_0^{2\pi}\int_0^{l}\tilde{u}_{rr}(a, \varphi, z; a, \varphi_0, z_0)R_1(\varphi_0, z_0)d\varphi_0 dz_0+ \\ \quad+\int_0^{2\pi}\int_0^{a}[\tilde{u}_{rz}(a, \varphi, z; r_0, \varphi_0, 0)-\tilde{u}_{rz}(a, \varphi, z; r_0, \varphi_0, l)]R_3(r_0\varphi_0)dr_0 d\varphi_0=0, \\ \tilde{u}_{0z}(r, \varphi, 0)+\int_0^{2\pi}\int_0^{l}\tilde{u}_{zr}(r, \varphi, 0; a, \varphi_0, z_0)R_1(\varphi_0, z_0)d\varphi_0 dz_0+ \\ \quad+\int_0^{2\pi}\int_0^{a}[\tilde{u}_{zz}(r, \varphi, 0; r_0, \varphi_0, 0)-\tilde{u}_{zz}(r, \varphi, 0; r_0, \varphi_0, l)]R_3(r_0, \varphi_0)dr_0 d\varphi_0=0, \\ \tilde{u}_{0\varphi}(a, \varphi, z)+\int_0^{2\pi}\int_0^{l}\tilde{u}_{\varphi\varphi}(a, \varphi, z; a, \varphi_0, z_0)R_2(\varphi_0 z_0)d\varphi_0 dz_0=0. \end{cases} \tag{4.4}$$

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The three-dimensional dynamic ...

By substituting the appropriate series expansions an infinite set of algebraic equations is obtained which is shown to be fully regular if

$$(\lambda+\mu)h_1^n a_n \leqslant |x_0|, \quad (\lambda+\mu)h_1^n a_n \leqslant |x_2|, \tag{5.10}$$

With $\lambda = \mu$ (i.e. Poisson's ratio = 0.25), this condition is satisfied for every real p, and for harmonic fields ($p^2 = \infty^2$)i when

$$\omega < \sqrt{a_1^2 - a_2^2}\,\frac{\pi}{l}, \quad \omega < \sqrt{a_1^2 - a_2^2}\,\frac{2.405}{a}, \tag{5.13}$$

$$a_1 = \sqrt{\frac{\lambda+2\mu}{\varrho}}, \quad a_2 = \sqrt{\frac{\mu}{\varrho}}.$$

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The three-dimensional dynamic ...

The question of inverse transformability, i.e., as to whether a solution of the problem of non-steady-state vibration has actually been found, is left open. There are 3 Soviet-bloc references

ASSOCIATION: Department of Vibrations, IBTP Polish Academy of Sciences

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3

S/058/62/000/002/016/053
A058/A101

AUTHORS: Kaliski, S., Rogula, D.

TITLE: Rayleigh's elastic waves on cylindrical surfaces in magnetic fields

PERIODICAL: Referativnyy zhurnal, Fizika, no. 2, 1962, 38, abstract 20288 ("Proc. Vibrat. Probl. Polish Acad. sci.", 1961, v. 2, no. 1, 29-39, English, Polish and Russian summaries)

TEXT: As was demonstrated by the authors in earlier works (RZhFiz, 1961, 6D611), the propagation of Rayleigh's elastic waves in a conducting medium placed in a permanent magnetic field leads to electromagnetic radiation into the surrounding vacuum and the elastic medium. In the present work the authors calculate the electromagnetic field incident to propagation of a wave along a circular cylinder and a cylindrical cavity in an elastic medium with perfect conductivity; the permanent magnetic field is oriented along the axis of the cylinder. The resulting general solution is used for Rayleigh waves propagating along (first case) and across (second case) the generatrix of the cylinder. In the first case the magnetic component of the electromagnetic field ebbs from the surface of the cylinder into the vacuum $\sim e^{-\delta r} \cdot r^{-1/2}$ and into the medium $\sim e^{-\delta r} \cdot r^{-1/2}$; in

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Rayleigh's elastic waves on cylindrical ...

the second case, $\sim r^{-1/2}$ and $\sim r^{m}$, respectively (m is the mode number of the Rayleigh wave). For fields within the cylindrical cavity more complex relationships were obtained.

L. Zarembe

[Abstracter's note: Complete translation]

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B180/B186

AUTHOR: Kaliski, Sylwester

TITLE: The Cauchy problem for an elastic dielectric in a magnetic field

PERIODICAL: Referativnyy zhurnal. Matematika, no. 10, 1962, 58-59, abstract 10B268 (Proc. Vibrat. Probl. Polish Acad. Sci., v. 2, no. 3, 1961, 237-249 [Eng.; summaries in Pol. and Russ.])

TEXT: The article considers the unsteady problem of the deformations of an elastic dielectric in a magnetic field. The mathematical problem consists in the combined integration of a system of Maxwell equations and those of the theory of elasticity. Moreover, in the elastic-theory equations there are volumetric forces of electromagnetic origin, and in the Maxwell system there are additional currents due to the displacement of the charged parts of the dielectric. The author considers the linearized system:

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$$\operatorname{rot} h = \frac{4\pi}{c} j + \frac{\varepsilon}{c}\frac{\partial E}{\partial t} + \frac{\varepsilon\mu - 1}{c^2}\frac{\partial}{\partial t}\left[\frac{\partial u}{\partial t} \times H\right],$$

$$\operatorname{rot} E = -\frac{\mu}{c}\frac{\partial h}{\partial t},$$

$$j = \lambda_0\left(E + \frac{\mu}{c}\left[\frac{\partial u}{\partial t} \times H\right]\right), \rho\frac{\partial^2 u}{\partial t^2} = G\nabla^2 u + (\lambda +$$

$$+ G)\operatorname{grad}\operatorname{div} u + \frac{\mu}{c}[j \times H] + \frac{1}{4\pi c}(\mu\varepsilon - 1)\left[\frac{\partial E}{\partial t} \times H\right] +$$

$$+ \frac{\mu}{4\pi c^2}(\varepsilon\mu - 1)\left[\frac{\partial}{\partial t}\left[\frac{\partial u}{\partial t} \times H\right] \times H\right] + P,$$

$$\operatorname{div} h = 0, \quad \operatorname{div} D = \rho_0,$$

$$D = \varepsilon\left(E + \frac{\mu\varepsilon - 1}{c\varepsilon}\left[\frac{\partial u}{\partial t} \times H\right]\right)$$

($\vec{H}$ is the primary magnetic field, which is assumed to be constant; $\vec{h}$ is the additional magnetic field due to deformations of the dielectric. The other notations are standard. The order of the full system is 12. In previous works by the author, published in the same journal (RZhMat, 1962, 5B374, 375) the case of a conducting solid was considered, where the deformation current is negligible as compared with the conduction current. The present work deals with the opposite case. If the conduction current

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is neglected, then a total system of the twelfth order will break down into four wave equations and one equation of the fourth order, in which the operator of the left-hand part decomposes into the derivative of two second-order operators. New functions of the potential type are also introduced here. The author calls them the resolving ones. The wave equation solutions are known, and the fourth-order equation is reduced to an integral one of the second-order Volterra type. It is noted that the solution is simpler for a dielectric than for a conductor.
[Abstracter's note: Complete translation.]

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S/058/62/000/002/015/053
A058/A101

AUTHOR: Kaliski, S.

TITLE: Plane shock wave in solids with perfect electric conductivity in a magnetic field

PERIODICAL: Referativnyy zhurnal, Fizika, no. 2, 1962, 37, abstract 2G281 ("Proc. Vibrat. Probl. Polish Acad. sci.", 1961, v. 2, no. 1, 57-66, English, Polish and Russian summaries)

TEXT: In the presence of a tangentially directed magnetic field, plane elastic waves in solid half-spaces propagate normal to the surface of the half-space. The elastic properties of solids are assumed to be such that stress increases in them faster than strain, and this leads to shock waves. Analytical solution of the problem yields the speed of propagation of shock waves, the heating of the substance as a result of the passing wave (this admits of a simple geometric interpretation) and other properties (the stress-strain curve has a point of inflection). For a certain relationship between stress and strain the solution can be found by means of the Riemann method.

G. Ostroumov

[Abstracter's note: Complete translation]

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3

S/124/63/000/001/011/080
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AUTHORS: Kaliski, Sylwester and Solarz, Lech

TITLE: Aeroelastic vibration and stability of a deformable rotating rocket in a linearized flow

PERIODICAL: Referativnyy zhurnal, Mekhanika, no. 1, 1963, 30, abstract 1B168 (Proc. Vibrat. Probl. Polish Acad. Sci., 1962, v. 3, no. 1, 57-68 (Eng.: summaries in Pol. and Rus.))

TEXT: The differential equation describing small vibration of an elastic rotating rocket in a supersonic linearized stream is reduced to Volterra's integral equation, for which the critical combinations of parameters are found. An example is given of the design of a rigid two-stage rocket with an elastic connection between the stages. It is pointed out that the velocity of rotation of the rocket substantially affects the critical velocities and the character of aeroelastic phenomena.
[Abstracter's note: Complete translation]

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AUTHOR: Kaliski, Sylwester

TITLE: The Cauchy problem on the motion of an elastic isotropic conductor in a magnetic field

PERIODICAL: Referativnyy zhurnal, Matematika, no. 5, 1962, 82, abstract 5B375. ("Proc. Vibrat. Probl. Polish Acad. sci.", 1961, 2, no. 2, 179-198)

TEXT: The author analyses the general linear system of equations for the motion of an elastic medium in a magnetic field (equation system of 12th order). The system can be reduced to the system earlier considered by the author, if one can neglect the displacement currents in comparison to the conduction currents ("good conductor"). The latter system separates under certain simplifying assumptions by introducing special resolving potential functions (Ref. 5B374) in equations of 2nd, 4th and 6th order. The author shows that the Cauchy problem for a system of 12th order leads to individual Cauchy problems for three equations of lower order. This simplifies the problem considerably, although one large difficulty remains, i. e., the integration of the equation of 6th order. The author gives an approximate solution for the case of weak influence of the

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The Cauchy problem on the motion ...

magnetic field on the motion of the body, and he gives the Volterra integral equation for the determination of the solution functions; the kernels of the integral equations are known Green functions for the double wave equation of the dynamic elasticity theory. Finally the author gives the generalization of the results on non-ideal elastic mediums which are described by the linear Bolzmann model. He also notes that the reduction of the Cauchy problem for an equation of 12th order to the Cauchy problem for equations of lower order is also possible in the other limit case, where the displacement currents are larger than the conduction currents (dielectric). In this case also a relatively simple representation of the solution functions is possible.

[Abstracter's note; Complete translation.]

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24 1460

AUTHOR: Kaliski, Sylwester (Warsaw)

TITLE: A dynamic non-steady state problem of an anelastic cylinder of finite length

PERIODICAL: Archiwum mechaniki stosowanej, v. 13, no. 1, 1961, 55-62

TEXT: Starting with the results he obtained for an elastic cylinder (Ref. 1: The Three Dimensional Dynamic Problem of a Cylinder of Finite Length, Arch. Mech, Stos., 1, 12 (1960)), the author introduces an anelastic body which enables him to solve in a general manner, the problem of non-steady stare vibration, and the problem of harmonic vibration for any ω, for such a body. The Voigt anelastic model is assumed, and in order to achieve greater clarity in the solution, as well as to enable direct application to the results obtained from the elastic case, a particular relation between the volume damping and the form damping is assumed. The author confines himself to the first boundary value problem, and considers one of

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A dynamic non-steady state...

the symmetric cases of this problem. This paper continues the work of the author on vibrations in an elastic parallelepiped (Ref. 3: The Dynamical Problem of the Rectangular Parallelepiped, Arch. Mech. Stos., 3, 10 (1958)), and on vibrations in an elastic cylinder where the two dimensional case had been considered (Ref. 2: The Dynamic Non-Steady Axially Symmetric Problem of a Cylinder, Arch. Mech. Stos. 6, 10 (1958)). In Ref. 1 (Op. cit) the author had produced a solution for the spatial problem of an elastic cylinder, and in (Ref. 4: The Dynamical Non-Steady Problem of the Inelastic Parallelepiped, Arch. Mech. Stos., 5/6, 12 (1960)), the dynamic non-steady state (and general harmonic state) solution was obtained for an anelastic parallelepiped. The author claims that the solution procedure for other Voigt models of solids will be analagous. The equations of motion of an anelastic solid of the Voigt type are

$$\mu\nabla^2\mathbf{u}+(\lambda+\mu)\,\mathrm{grad\,div\,u}+\frac{\partial}{\partial t}[\mu'\nabla^2\mathbf{u}+(\lambda'+\mu')\,\mathrm{grad\,div\,u}]-\varrho\frac{\partial^2\mathbf{u}}{\partial t^2}=-\mathbf{P}. \qquad (2.1)$$

using a simplifying assumption

$$\mu'/\lambda = \mu'/\mu = \eta. \qquad (2.2)$$

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A dynamic non-steady state...

passing to the cylindrical coordinates, and seeking for a solution through $u = \Phi + \text{grad } \Psi$ (2.4)

and subjecting the resulting set of four equations to the Laplace transformation (and assuming homogeneous initial conditions), the equations below are obtained

$$\begin{cases} \left\{[\mu(r^2\nabla^2-1)-\varrho r^2p^2]^2+(2\mu)^2\frac{\partial^2}{\partial\varphi^2}\right\}\tilde{\theta}_r = r^2\tilde{B}_r, \\ \left\{\mu(r^2\nabla^2-1)-\varrho r^2p^2]^2+(2\mu)^2\frac{\partial^2}{\partial\varphi^2}\right\}\tilde{\theta}_\varphi = r^2\tilde{B}_\varphi, \\ (\mu\nabla^2-\varrho p^2)\tilde{\Phi}_z = \tilde{B}_z, \\ [(\tilde{\lambda}+2\mu)\nabla^2-\varrho p^2]\tilde{\Psi} = \tilde{H}, \end{cases} \quad (2.10)$$

where

$$\tilde{\mu} = \mu(1+\eta p), \quad \tilde{\lambda} = \lambda(1+\eta p) \quad (2.11)$$

and

$$u_r = \Phi_r + \frac{\partial\Psi}{\partial r}, \quad u_\varphi = \Phi_\varphi + \frac{1}{r}\frac{\partial\Psi}{\partial\varphi}, \quad u_z = \Phi_z + \frac{\partial\Psi}{\partial z}, \quad (2.5)$$

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A dynamic non-steady state...

and $-P = \text{Grad } H + \text{rot } S = \text{grad } H + B$ (2.6)

Using Green's tensor, a system of Fredholm integral equations of the I-type are constructed for the first boundary value problem, the solution of the second boundary value problem being analagous. By considering the symmetric case introduced by splitting the problem in relation to the middle axis of the cylinder, the system of integral equations is reduced to an infinite system of algebraic equations, with unknowns depending upon the value of the parameter p of the integral transformation. The conditions of full regularity of the finite system of algebraic equations are

$$|(\bar{\lambda}+\beta)h_i^n a_m| < |(\bar{\lambda}+\beta)a_m^2+\beta(h_i^{n2}+a_m^2)+\varrho p^2|, \quad (3.1)$$

$$|(\bar{\lambda}+\beta)h_i^n a_m| < |(\bar{\lambda}+2\beta)(h_i^{n2}+a_m^2)+\varrho p^2-(\bar{\lambda}+\beta)a_m^2|, \quad (3.2)$$

where

$$a_m = \frac{m\pi}{l}, \quad h_i^2 = \frac{1}{a}\gamma_i^2,$$

On writing $\lambda = \mu$ (which corresponds to Poisson's ratio), and p = g +

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A dynamic non-steady state...

ie, further manipulation produces

$$2.95\pi^2 > \frac{2l^2}{a_2^2\eta^2}, \tag{3.16}$$

or

$$\eta_{cr} > \sqrt{\frac{2}{2.95\pi^2}}\frac{l}{a_2} \approx 0.26\frac{l}{a_2}. \tag{3.17}$$

η_{cr} depends on the greatest dimension of the cylinder, and is in the region 10^{-6} to 10^{-4} for real materials. The approximate solution of the infinite system of equations should be subjected to inverse transformation and should be verified by substituting in the original system of equations. The last equation given above is also the criterion for full regularity of the infinite system of equations for the case of a harmonic excitation field if p is replaced by $i\omega$. This is true for any ω, but if damping is disregarded it is only true for $\omega < \omega_0$. In conclusion, it has been shown that the introduction of bodies with features nearer those of real

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A dynamic non-steady state...

bodies enabled the difficulty met in elastic bodies (that is full regularity of the infinite system true only if $\omega < \omega_0$, in the harmonic case) to be overcome. In this paper the problem was practically [Abstracter's note: "practically" is the author's word] solved in a general manner, that is for any range of ω in the case of harmonic vibration and for any non-steady state vibration. There are 4 Soviet-bloc references.

ASSOCIATION: Department of Vibrations, IBTP Polish Academy of Sciences

SUBMITTED: May 4, 1960

Card 6/6

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3"

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29462
24.4200 1327 1103, 1191 P/033/61/013/004/005/005
D248/D302

AUTHOR: Kaliski, Sylwester (Warsaw)

TITLE: Propagation of plastic cylindrical unloading waves in bodies with rigid unloading characteristics

PERIODICAL: Archiwum mechaniki stosowanej, v. 13, no. 4, 1961, 511-526

TEXT: The paper presents a tentative solution to the problem of a plastic unloading wave, in the case of plane stress and strain, in an infinite space with a cylindrical boring and a normal axially symmetric pressure acting on the surface of this boring. A rigid unloading characteristic is assumed for the material which allows a closed-form solution to be obtained. The author claims that his assumptions constitute a good approximation to reality, and the simplicity of the solution enables it to be used in practice and helps to avoid numerical computations, where it is impossible to obtain an estimate of the error. The assumptions made are that the stress-strain diagram is as shown in Fig. 3 and that

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Propagation of plastic ...

approximate linearized expressions are used for stress and strain intensities. The latter assumption introduces an error of 7% at most. The Henki-Il'yushin equations /Abstractor's note: Known generally in the West as the Hencky-Mises equations/ are written in cylindrical form for plane strain and plane stress. Taking

$$\sigma_i = \alpha \varepsilon_i \qquad (2.6)$$

where α is a constant and combining with the Hencky-Ilyushin and the equation of motion, the stress difference $\sigma_r - \sigma_\varphi$ and the strain ε_z are expressed as functions of the general strain. On introducing a new function $f(\theta)$ where $\theta = \varepsilon_\varphi - \varepsilon_x$ the following equations are obtained for the stresses:

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Propagation of plastic ...

$$\sigma_r - \sigma_\varphi = -2\rho f(\theta) + \left(\frac{2}{9}\alpha + 2K\right)\theta = -2\rho f\theta + \varkappa_1\theta,$$

$$\sigma_r = -\rho f(\theta) + \left(\frac{2}{9}\alpha + 2K\right)\frac{u}{r} = -\rho f(\theta) + \varkappa_1 \frac{u}{r} \qquad (2.29)$$

The loading and unloading wave for plane stress and strain is considered at length and a system of equations is arrived at which constitutes the full system for the problem. It is indicated how they may be solved either numerically (though this is cumbersome) or by letting a term tend to zero and passing to the limit. However, the author then proceeds to solve the case of a strong discontinuity wave in what he claims is a much simpler way. An integro-differential equation is obtained which can sometimes be solved in a closed form, or may be reduced to a Volterra integral equation and solved by successive approximation. A numerical example is considered in which infinite space with a unit borning (r_0=1)

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Propagation of plastic ...

has pressure suddenly applied and then monotonically decreased to zero. An expression for σ_r is obtained. The author concludes that his solutions can be generalized to the case of more complicated stress-strain relations, but in these cases recourse would be necessary to numerical methods. Also the accuracy of the solutions would be less because the approximation to the principle of cylindrical plastic loading is much worse. The author claims that the special solution he obtains is particularly convenient for investigating the propagation of plastic waves in soils, in particular if the influence of the strain rate on the physical properties of the medium can be disregarded. There are 6 figures and 5 Soviet-bloc references.

ASSOCIATION: Department of Vibrations, IBTP Polish Academy of Sciences, Warsaw

SUBMITTED: March 8, 1961

Card 4/5

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3

Propagation of plastic ...

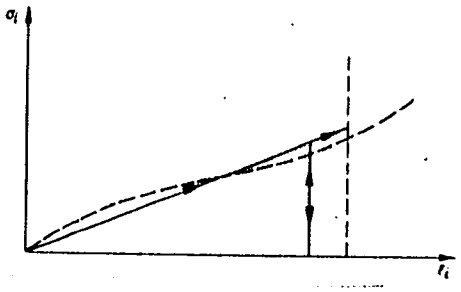

Fig. 3 .

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3

S/044/63/000/002/027/050
A060/A126

AUTHOR: Kaliski, Sylwester

TITLE: Rayleigh waves between perfectly conducting fluid and a solid body in a magnetic field

PERIODICAL: Referativnyy zhurnal, Matematika, no. 2, 1963, 55, abstract 2E245 (Proc. Vibrat. Probl. Polish Acad. Sci., 1962, v. 3, no. 1, 23 - 39; English; summaries in Polish, Russian)

TEXT: Rayleigh waves in a solid body bordering on a fluid and situated in a constant magnetic field are studied with the aid of linearized equations of magneto-hydrodynamics. Both media are taken as ideally conducting. Three cases of orientation of the magnetic field are considered: 1) perpendicular to the plane of the fluid-solid interface; 2) parallel to the plane of the interface and perpendicular to the direction of wave propagation; 3) parallel to the direction of wave propagation. A characteristic equation for Rayleigh waves is constructed. It is indicated that in case 1) Rayleigh waves cannot exist (on account of the ideal conductivity of the media); in case 2) the velocity of

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S/044/63/000/002/027/050
A060/A126

Rayleigh waves between perfectly conducting ....

Rayleigh waves is between c_1 and c_2, where c_1 and c_2 are the wave velocities at $H = 0$ and $H = \infty$, respectively; in case 3) Rayleigh waves can exist only for definite values of the magnetic field.

S.V. Nesterov

[Abstracter's note: Complete translation]

Card 2/2

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3

KALISKI, Sylwester

Propagation of magnetoelastic and plastic waves in a dielectric semispace under mechanical impulse. Proceed vibr probl 3 no.2:131-140 '62.

1. Department of Vibrations, Institute of Basic Technical Problems, Polsih Academy of Sciences, Warsaw.

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3

KALISKI, S.; NOWACKI, W.

Excitation of mechanical-electromagnetic waves induced by a thermal shock. Bul Ac Pol tech 10 no.1:[25]-[33] '62.

1. Department of Mechanics of Continuous Media, Institute of Fundamental Technical Problems, Polish Academy of Sciences, Warsaw. Presented by W.Nowacki.

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3

KALISKI, Sylwester; SOLARZ, Lech

Aero-magneto-flutter of a plate flown past by a perfectly conducting gas in magnetic field with isotropic action. Proceed vibr probl 3 no.3:213-225 '62.

1. Department of Vibrations, Institute of Basic Technical Problems, Polish Academy of Sciences, Warsaw.

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3

KALISKI, Sylwester; SOLARZ, Lech

Aero-magneto-flutter of a plate flown past by a perfectly conducting gas in magnetic field with anisotropic action. Proceed vibr probl 3 no.3:227-240 '62.

1. Department of Vibrations, Institute of Basic Technical Problems, Polish Academy of Sciences, Warsaw.

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3"

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S/044/62/000/012/024/049
A060/A000

AUTHOR: Kaliski, S., Nowacki, W.

TITLE: Excitation of mechanical-electromagnetic waves induced by thermal shock

PERIODICAL: Referativnyy zhurnal, Matematika, no. 12, 1962, 68, abstract 12B306 (Bull. Acad. polon. sci. Sér. sci. techn., 1962, v. 10, no. 1, 25 - 33, English; summary in Russian)

TEXT: An elastic half-space is located in an initially homogeneous magnetic field, parallel to the boundary of the half-space with vacuum. At the instant t = 0 the boundary face is abruptly heated to the temperature T_0 which is then held constant. As a result there arise temperature, mechanical and electromagnetic oscillations. The mathematical problem reduces to the simultaneous integration of the equation of electrodynamics of a slowly moving medium, of the theory of elasticity, and of heat conduction. A number of simplifying assumptions is made, and it is the homogeneous linearized problem which is considered. The solution is obtained in explicit form with the aid of the Laplace transform. In the elastic medium there arise a mechanical and an electromagnetic wave, in the vacuum an electromagnetic shock wave is radiated.

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3

KALISKI, S.; NOWACKI, W.

Combined elastic and electromagnetic waves produoded by thermal shock in the case of a medium of finite electric conductivity. Bul Ac Pol tech 10 no.4:[213]-[233] '62.

1. Department of Mechanics of Continuous Media, Institute of Fundamental Technical Problems, Polish Academy of Sciences, Warsaw. Presented by W.Nowacki.

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3

KALISKI, Sylwester; WLODARCZYK, Edward

Reflection of a cylindrical unloading wave from an undeformable wall in a body with rigid unloading characteristic. Proceed vibr probl 3 no.2:157-170 '62.

1. Department of Vibrations, Institute of Basic Technical Problems, Polish Academy of Sciences, Warsaw.

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3

S/124/63/000/002/017/052
D234/D308

AUTHORS: Kaliski, S., Płochocki, Z. and Rogula, D.

TITLE: Asymmetry of the stress tensor and conservation of angular momentum for a combined mechanic and electromagnetic field in a continuous medium

PERIODICAL: Referativnyy zhurnal, Mekhanika, no. 2, 1963, 1, abstract 2V1 (Bull. Acad. polon. sci. Ser. sci. techn. v. 10, no. 4, 1962, 189-195 (Eng.; summary in Rus.))

TEXT: The authors consider the problem of the asymmetric stress tensor for a continuous medium and its connection with the law of conservation of angular momentum. The introduction of an asymmetric stress tensor becomes necessary in practically important equations of phenomenological fields in piezoelectric or ferromagnetic bodies, ferrites, etc. Literature on the problem of asymmetry of the stress tensor is reviewed. It is proved that the asymmetry of the full stress tensor is possible only in the presence of a local, proper angular momentum of the medium, e.g. spin. The authors

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3

S/124/63/000/002/017/052
D234/D308

Asymmetry of the stress tensor ...

give an example of building up consistent equations of a magneto-elastic medium with a spin, interacting with an electromagnetic field. 18 references.
[Abstracter's note: Complete translation]

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APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3

KALISKI, Sylwester; PLOCHOCKI, Zbigniew; ROGULA, Dominik

Asymmetric stress tensor and the angular momentum conservation law in the equations of combined mechanical and electromagnetic field in a continuous medium. Proceed vibr probl 3 no.3:253-260 '62.

1. Department of Vibrations, Institute of Basic Technical Problems, Polish Academy of Sciences, Warsaw.

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3

KALISKI, Sylwester

Magnetoelastic vibration of perfectly conducting plates and bars assuming the principle of plane sections. Proceed vibr probl 3 no.4:225-234 '62.

1. Department of Vibrations, Institute of Basic Technical Problems, Polish Academy of Sciences, Warsaw.

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3

KALISKI, Sylwester

Waves produced by a mechanical impulse on the surface of a semispace constituting a real conductor in magnetic field. Proceed vibr probl 3 no.4:293-304 '62.

1. Department of Vibrations, Institute of Basic Technical Problems, Polish Academy of Sciences, Warsaw.

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3

KALISKI, Sylwester; MICHALEC, Jerzy

The resonance amplification of a magnetoelastic wave radiated from a cylindrical cavity. Proceed vibr probl 4 no.1:7-15 '63.

1. Department of Vibrations, Institute of Basic Technical Problems, Polish Academy of Sciences, Warsaw.

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3

KALISKI, Sylwester

Absorption of magento-viscoelastic surface waves in a real conductor in a magnetic field. Proceed vibr probl 4 no. 4: 319-330 '63.

Attenuation of surface waves between perfectly conducting fluid and solid in a magnetic field normal to the contact surface. Ibid.:375-385.

1. Department of Vibrations, Institute of Basic Technical Problems, Polish Academy of Sciences, Warsaw.

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3

KALISKI, S.

Mechanical generation of Cerenkov radiation in a perfact elastic conductor adjacent to a vacuum and contained in a magnetic field of isotropic action. Bul Ac Pol tech 11 no.11:637-646 '63.

Mechanical generation of Cerenkov radiation in a perfect elastic conductor adjacent to a vacuum and contained in a magnetic field of anisotropic action. Ibid.:647-658

1. Department of Vibrations, Institute of Fundamental Technical Problems, Polish Academy of Sciences, Warsaw.

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3

KALISKI, S.

Mechanical generation of Cerenkov radiation in contacting; perfectly conducting elastic solid and liquid in magnetic field of isotropic action. Bul Ac Pol tech 11 no. 12:709-716 '63.

Mechanical generation of Cerenkov radiation in contacting, perfectly conducting elastic solid and liquid in magnetic field of anisotropic action. Ibid.: 717-728.

1. Department of Vibrations, Institute of Fundamental Technical Problems, Polish Academy of Sciences, Warsaw.

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3

KALISKI, Sylwester

Model of a continuum with essentially nonsymmetric tensor of mechanical stress. Archiw mech 15 no.1:33-45 '63.

1. Department of Vibrations, Institute of Basic Technical Problems, Polish Academy of Sciences, Warsaw.

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3

ACCESSION NR: AP3008940 P/0033/63/015/003/0359/0369

AUTHOR: Kaliski, Sylwester; Michalec, Jerzy (Warsaw)

TITLE: Magnetoelastic resonance vibration of a perfectly conducting cylinder in a magnetic field

SOURCE: Archiwum mechaniki stosowanej, v. 15, no. 3, 1963, 359-369

TOPIC TAGS: magnetoelastic resonance vibration, perfectly conducting elastic cylinder, magnetic field, Voight body, nonelastic body, elastic body, elastic cylinder

ABSTRACT: In considering the problem of magnetoelastic resonance vibration of a perfectly conducting elastic cylinder in an originally axial magnetic field, the authors examine the general case of a cylinder with mechanical internal damping. For the resonance amplitudes, they confine themselves to the influence of electromagnetic radiation into the vacuum adjacent to the cylinder, assuming the cylinder to be perfectly elastic. They obtain a set of equations and the boundary conditions for a nonelastic (Voight) body, as well as a general solution for a nonelastic and an elastic body. Finally, they determine the fundamental resonance frequency for a perfectly elastic cylinder and the resonance amplification of the amplitude of the cylinder (limited owing to the radiation of the electromagnetic energy into the vacuum).

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3

ACCESSION NR: AP3008940

ASSOCIATION: Department of Vibration, IBTP Polish Academy of Sciences

SUBMITTED: 16Jul62 DATE ACQ: 24Oct63 ENCL: 00

SUB CODE: 00 NO REF SOV: 002 OTHER:003

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17

KALISKI, Sylwester

Rayleigh waves in an elastic dielectric in a magnetic field. Proceed vibr probl 4 no.1:85-93 '63.

1. Department of Vibrations, Institute of Basic Technical Problems, Polish Academy of Sciences, Warsaw.

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3

KALISKI, Sylwester

The passage of an elastic wave in a perfect conductor across a varuum gap in a magnetic field. Archiw mech 15 no.4:507-515 '63

1. Department of Vibrations, Institute of Basic Technical Problems, Polish Academy of Sciences, Warsaw.

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3

KALISKI, Sylwester

The Cerenkov radiation in an elastic dielectric contained in a magnetic field. Proceed vibr probl 4 no. 3:215-233 '63.

Cerenkov radiation in a perfect elastic conductor in a magnetic field of anisotropic action, excited by a moving impulse. Ibid.:301-315.

1. Department of Vibrations, Institute of Basic Technical Problems, Polish Academy of Sciences, Warsaw.

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3

KALISKI, Sylwester

Magnetoelastic vibration of a perfectly conducting cylindrical shell in a constant magnetic field. Archiw mech 15 no.2:197-208 2 '63.

1. Department of Vibrations, Institute of Basic Technical Problems, Polish Academy of Sciences, Warsaw.

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3

KALISKI, Sylwester

Motion stability of a system of oscillators moving along a beam on elastic foundation. Mechan teor stosow 2 no. 1:3-14 '64.

1. Department of Vibration Studies, Institute of Basic Technical Problems, Polish Academy of Sciences, Warsaw.

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3

KALISKI, Sylwester

Self-excited vibration of a system of oscillators moving on the surface of an elastic semispace. Proceed vibr probl 5 no. 1: 3-18 '64.

1. Department of Vibrations, Institute of Basic Technical Problems, Polish Academy of Sciences, Warsaw.

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3

KALISKIY, S. [Kaliski, S.] (Varshava, Pol'sha)

Mechanical generation of Cherenkov radiation in an elastic conductor on contact with a liquid in an isotropic magnetic field. Prikl. mat. i mekh. 28 no.5:862-867 S-O '64.
(MIRA 17:11)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3

KALISKI, S.

Self-excited vibrations of an electron stream moving in a magnetic field above the surface of a perfect liquid conductor. Proceed vibr probl 5 no.4:263-278 '64.

1. Department of Vibrations of the Institute of Basic Technical Problems of the Polish Academy of Sciences, Warsaw.

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3

KALISKI, S.; SOLARZ, L.

On a feature of the phenomenon of aeromagnetic flutter of a plate in magnetic field normal to its surface. Proceed vibr probl 5 no.2:125-135 '64.

1. Department of Vibrations, Institute of Basic Technical Problems, Polish Academy of Sciences, Warsaw.

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3

KALISKI, S.; NOWACKI, W. K.; WLODARCZYK, E.

Propagation and reflection of a spherical wave in an elastic-viscoplastic strain hardening body. Proceed vibr probl 5 no. 1: 31-56 '64.

1. Department of Vibrations, Institute of Basic Technical Problems, Polish Academy of Sciences, Warsaw.

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3

KALISKI, S.

Stability of relative motion of two perfectly conducting elastic media in a magnetic field parallel to the direction of motion. Proceed vibr probl 5 no.2:75-87 '64.

1. Department of Vibrations, Institute of Basic Technical Problems, Polish Academy of Sciences, Warsaw.

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3

BOGACZ, R.; KALISKI, S.

Stability of motion of nonlinear oscillators moving along a beam on an elastic foundation. Proceed vibr probl 5 no.4:279-296 '64.

1. Department of Vibrations of the Institute of Basic Technical Problems of the Polish Academy of Sciences, Warsaw.

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3

KALISKY, S. [Kaliski, S.]

Mechanical generation of Cherenkov radiation in an ideally conducting elastic medium bordering on a vacuum. Part 1. Izv.vys.uchab.zav.: radiofiz. 7 no.4:618-626 '64. (MIRA 18:5)

Mechanical generation of Cherenkov radiation in an ideally conducting elastic medium bordering on a vacuum. Part 2. Ibid.:629-635

1. Institut osnovnykh problem tekhniki Pol'skoy akademii nauk.

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3

KALISKI, S.

Stability of relative motion of a perfectly conducting liquid and a perfectly conducting solid in a magnetic field parallel to the direction of motion. Proceed vibr probl 5 no.3:179-191 '64.

Self-excited vibration of an electron stream moving over the surface of an elastic conductor in magnetic field. Ibid.:209-230

1. Department of Vibrations of the Institute of Basic Technical Problems of the Polish Academy of Sciences, Warsaw.

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L 61713-65 ARG/EWT(d)/FBD/FBO/EWP(w)/EWG(s)-2/EWP(c)/EWP(v)/T-2/EWP(k)/EWP(h)/
FCS(k)/EWA(h)/ETC(m) Pr-4/Pf-4/Pn-4/Peb/Pw-4 WW/EM

TITLE: Flutter of a deformable rocket in supersonic flow according to the second asymptotic approximation

[illegible] problems, v. 1, no. 1, 1965, [illegible]

[illegible] differential equation [illegible]

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3

ABSTRACT: In order to correct the rather large error arising from too few terms of the expansion of the variational method of obtaining an approximate

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3

S. Kaliski and L. Solarz (Aeroelastic vibrations and stability of rotating deformable rocket in linearized flow, Proc. Vibr. Probl., 1, 3, 1962), while the rocket motion is described by the linear beam equation [illegible]

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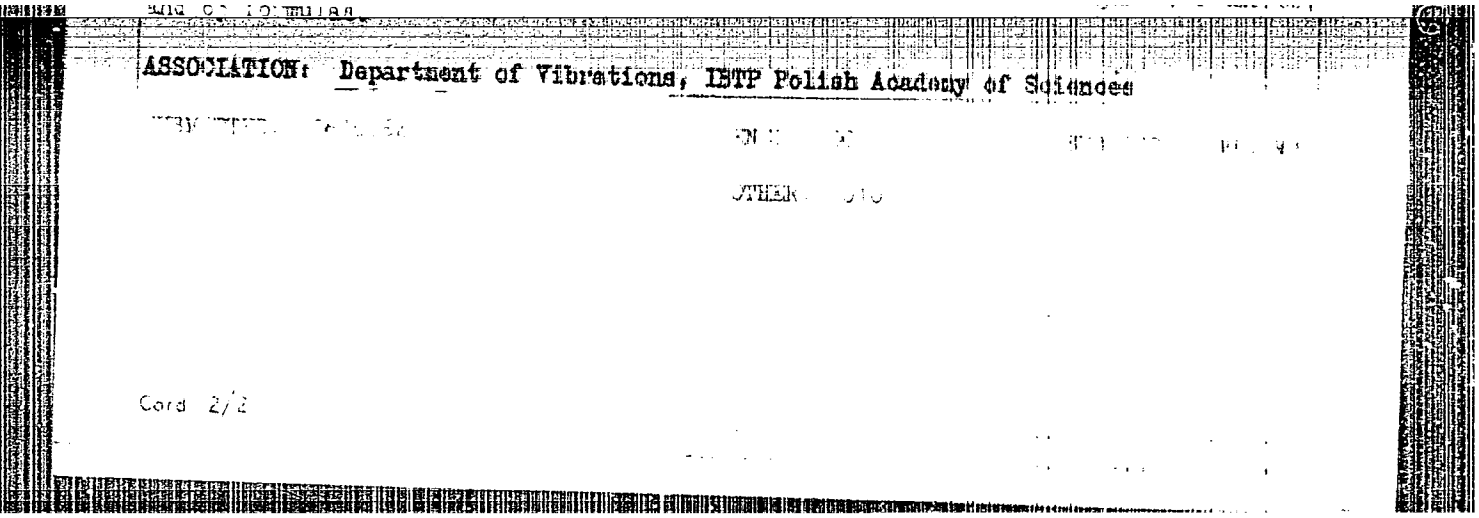
"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3



AUTHOR:

ASSOCIATION: Department of Vibrations, IBTP Polish Academy of Sciences

OTHER:

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620120007-3

L 01062-66 EWP(e)/EWP(i)/T/EWP(k)/EWP(b)/EWA(h) WH

ACCESSION NR: AP5016899 PO/0097/65/006/001/0013/0032

AUTHOR: Kaliski, S. (Warsaw)

TITLE: Amplification of a longitudinal ultrasonic wave in a piezoquarts by means of an external electron stream

SOURCE: Proceedings of vibration problems, v. 6, no. 1, 1965, 13-32

TOPIC TAGS: piezoquartz, ultrasonic wave amplification, elastic wave amplification, ultrasonic amplifier

ABSTRACT: Amplification of longitudinal ultrasonic waves in a piezoquartz by means of external electron streams is considered. The problem is analogous to the author's previously published results (Self-excited vibrations of a stream of electrons moving over the surface of an elastic conductor in magnetic field, Proc. Vibr. Probl. 3, 5, 1964 and Proc. Vibr. Probl. 4, 5, 1964) except that in the present case the coupling between the body and stream fields is electrical. The problem is restricted to the one-dimensional case of longitudinal vibrations (no field gradients in x_2 and x_3 directions) in the nonrelativistic region. Based on linearized perturbed stream equations and elastic wave equations, a differential equation is derived from which the dispersion equation $(\alpha - kV_0) = \Omega^2\left(1 - \frac{r}{1-\beta^2}\right)$,

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where $\Omega^2 = 4\pi\frac{\varrho_0\eta}{1+a}$; $r = \frac{4\pi a\varepsilon^2}{\varrho_0 a^2(1+a)}$; $\beta = \frac{\omega}{ka}$ is obtained. After assuming $\alpha \ll \varepsilon$, the wave velocity is given as

$$a^2 = \frac{1}{\varrho}\left[c + \frac{4\pi\varepsilon^2}{\varepsilon}\right],$$

where

$$\Omega^2 = 4\pi\frac{\varrho_0\eta}{\varepsilon}, \quad r = \frac{4\pi\varepsilon^2}{\varrho_0 a^2}.$$

The region of U

$$\frac{V_0}{a} = U, \quad \frac{\omega}{ka} = \beta_1, \quad U - \beta_1 = \beta_2, \quad \Omega_1^2 = \frac{\Omega^2}{k^2a^2},$$

over which amplification will occur, can be calculated from

$$\beta_2 = \Omega_1\sqrt{1 - \frac{r}{1-\beta_1^2}} = \varphi(\beta_1), \qquad \beta_2 = U - \beta_1,$$

and the factor ξ

$$k = k_0 + ik_1, \quad \nu = \frac{k_1}{k_0}, \quad \xi = \frac{\omega}{ak_0},$$

and the amplification coefficient ν can then be obtained from

$$U = \frac{\xi}{1-\nu^2}\sqrt{1 \pm \left\{1 - (1-\nu^2)\left[1 - \frac{\Omega^2}{\omega^2}\left(1 - r\frac{(1-\xi^2-\nu^2)(1-\nu^2)+4\nu^2}{(1-\xi^2-\nu^2)^2+4\nu^2}\right)\right]\right\}^{\frac{1}{2}}}$$

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$$\nu^2 = -(1+\xi^2)+\sqrt{4\xi^2+\frac{r\xi^2\frac{\Omega^2}{\omega^2}}{U/\xi(U/\xi-1)}}.$$

For the frequency range from $1/2\pi$ to $40/2\pi$ Mc and plate length 1-10 cm, the amplification coefficient can be obtained from the simplified equation

$$\nu = \sqrt{\sqrt{\xi^4(4+r)}-(1+\xi^2)},\quad \left(\nu_{max}\approx\frac{\sqrt{r}}{2}\right)^{(*)},$$

where

$$\Omega = \sqrt{\frac{4\pi\eta\varrho_{ea}}{\varepsilon}} = 2.68\times10^4\sqrt{n},\qquad r = \frac{4\pi e^2 n}{\varrho\varepsilon\omega^2} = 8.3\times10^{-8}$$

for

$$1-\frac{\sqrt{r}}{2}<\xi<1+\frac{\sqrt{r}}{2},$$

and

$$(1-\sqrt{r})\frac{\Omega}{\omega}<U<(1+\sqrt{r})\frac{\Omega}{\omega},$$

$$\Delta U = 2\sqrt{r}\frac{\Omega}{\omega} = 0.132\frac{\Omega}{\omega},$$

(where ΔU is the variability range of the stream velocity U in which self-excited

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vibrations take place). A curve of ν is presented showing a maximum of 0.0456. The amplitude amplification and power amplification along the length l is then given by

$$W_s = 10^{0.434\nu l},$$

$$W_m = 10^{0.868\nu l},$$

(where $\omega = 10^7 \mu$). A numerical example demonstrating the calculation of the critical stream velocities is also presented. A future paper on the amplification of surface waves is planned. Orig. art. has: 74 formulas, 3 tables, and 3 figures.

ASSOCIATION: Department of Vibrations, IBTP Polish Academy of Sciences

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ACC NR: AP6017947 SOURCE CODE: PO/0097/65/006/003/0295/0314

AUTHOR: Danicki, E. (Warsaw); Kaliski, S. (Warsaw); Podolak, K. (Warsaw)

ORG: Department of vibrations, IBTP, Polish Academy of Sciences

TITLE: Concerning a paradox in self-excited vibrations of damped systems with traveling waves

SOURCE: Proceedings of vibration problems, v. 6, no. 3, 1965, 295-314

TOPIC TAGS: self excited vibration, vibration damping, vibration analysis, traveling wave, traveling wave tube, nonlinear vibration

ABSTRACT: The author studies self-excited vibrations of damped systems with traveling waves and analyzes problems such as the motion stability of a set of oscillators along a beam resting on an elastic foundation and the vibration of infinite plates and shells. The results are of a more general character and bear upon other problems, including that of a traveling-wave tube. It is shown that damping causes essential changes in the configurations of the instability region and in the critical parameters. If damping tends to zero, the continuity of the critical parameters in relation to systems with no damping is no longer preserved. Arbitrarily small damping results in a finite change. This phenomenon thus appears as a sort of physical paradox. The author shows that the paradox is caused by treatment of the problem as a stationary

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one, which can be explained away by considering self-excited vibration as a non-stationary process, in chich the continuity of the values of critical parameters is maintained if damping tends to zero. Then the dependency of the critical parameters of self-excited vibration on the degree of damping will always be continuous, and the paradox no longer arises. Depending on the choice of an approximate definition of a stationary process, it is shown that the same critical parameters obtained for infinite systems with traveling waves and small damping, can also be applied to a stationary process with no damping. Orig. art. has: 14 figures and 42 formulas. [GC]

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ACC NR: AP6017890 SOURCE CODE: PO/0097/65/006/004/0401/0422

AUTHOR Kaliski, S.

ORG: none

TITLE: amplification of ultrasonic and supersonic surface waves in a ~~piezo~~quartz crystal by a current flowing in a semiconducting boundary layer

SOURCE: Proceedings of vibration problems, v. 6, no. 4, 1965, 401-422

TOPIC TAGS: piezoelectric crystal, supersonic flow, ultrasonic wave, perturbation method, isotropic crystal, hypersonic wave, surface wave

ABSTRACT: The author applies to a surface wave a new concept developed for a longitudinal wave by him in an earlier work [Amplification of longitudinal ultrasonic waves in piezoquartz by a stream flowing in a semiconducting layer, Proc. Vibr. Probl., 4, 6 (1965)]. This concept consists of amplifying ultrasonic and hypersonic waves by means of a stream of electrons flowing over a thin semiconducting layer covering a piezoelectric plate. The use of a thin semiconducting layer made of materials with good thermal parameters (not nescessarily possessing

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piezoelectric properties) makes it possible to attain a continuous amplification effect. In this case, the piezoelectric medium forms a coupling system, while the thin semiconducting layer acts as guide for the drifting electrons. Qualitatively speaking solutions for a surface wave are to a certain extent similar to those for a longitudinal wave but they facilitate a more accurate interpretation of the problem; the solutions do differ quantitatively, and evidently, those for a surface wave are considerably more complicated. The practical possibilities of amplifying a surface wave are much greater since it is not necessary to limit the thickness of the piezodielectric plate. To simplify the conclusions, the author regards the elastic properties of the piezodielectricity as isotropic. Quartz is used as the piezodielectric medium. The surface waves are studied in the planes x, x_2 and x, x_3. Orig. art. has. 108 formulas and 1 figure. [GC]

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